A STUDY OF BOTTLED WATER QUALITY AND ITS REGULATIONS

by

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One may ask in reading the title of this paper why a student of geology would write a paper concerning bottled drinking water. One of the lesser known branches of geology is hydrogeology, which deals with the location and movement of both surface and ground water. One of the major concerns of a hydrogeologist is detecting and deterring pollution of surface and ground water. In the past, the purity of water issuing from underground sources was never questioned. Certain spring or well water even gained reputations for being therapeutic, and small but prosperous health resorts were begun around these sources of water. Today, however, there are innumerable sources of pollutants which can easily contaminate an underground water supply. There are increasingly frequent reports of pollutants issuing from chemical and radioactive waste dumps, industrial plants, and other sources which have contaminated large areas of land and, of course, the groundwater contained in that land. In spite of these reports, the idea that spring or well water is purer and healthier than surface water (from which most municipal supplies are derived) still persists. This idea is being promoted by water bottlers with the result that consumers are buying bottled water of perhaps dubious quality at premium prices.

This report is an attempt to collect information concerning regulations of bottled water, the enforcement of these regulations, and results of chemical and bacteriological tests that have been taken of various bottled waters in order to determine the quality of bottled water on the average.

Although at least 75% of the United States population has access to treated municipal waters, the sales of bottled water have increased phenomenally in recent years. In 1976, Americans spent an incredible 175 million dollars on bottled water (Botto, pg. 68). This has made bottled water the fastest growing sector of America's 12 billion dollar soft drink business with sales expanding more than ten percent annually since 1976 (Langley, pg. 69). A good example of this boom is Perrier, the most popular bottled water in America. In the fiscal year 1978, the U.S. sales of Perrier soared to around 30 million dollars from less than one million two years before (Business Week, 1979, pg.64). Because of this, Perrier doubled their operation's capacity to 800,000,000 bottles a year. Domestic bottlers are also enjoying the increased popularity of bottled water, producing some 388,000,000 gallons a year (Changing Times, 1978, pg. 14).

The sudden popularity of bottled water can be attributed to several factors, one of which is the current fitness and health craze in America. Bottled mineral water is considered by many as the ultimate health drink containing no calories, artificial flavorings, sweeteners, or preservatives. Although bottlers are prohibited in the United States from making any therapeutic claims for their products, many older individuals drink bottled mineral water hoping to cure a wide variety of illnesses including arthritis, gout, and assorted liver, kidney and stomach disorders.

Another reason for the increase in sales of bottled can be attributed to extensive advertising campaigns conducted by major bottlers coupled with an increased availability of their product to the average consumer. This

new approach to marketing was begun by Great Waters of France, Inc., Perrier's U.S. subsidiary. Hoping to capture a larger share of the American soft drink market, Perrier launched a two million dollar advertising campaign in mid-1977 which included extensive television and magazine advertisements aimed exclusively at adults. At the same time, Perrier changed its distribution practices dramatically by removing its product from exclusive gourmet and health food stores and distributing it to major supermarket chains. The success of Perrier's campaign spurred other bottlers into major advertising campaigns. The result of this fierce competition for approximately one percent of the soft drink market has been a barrage of propaganda on the merits of bottled drinking water directed toward the American public.

One of the major reasons for Americans drinking bottled water seems to involve taste. A Gallup poll on community water supplies found that 30% of Americans were displeased with their tap water. Fourteen percent of this group stated that their water tasted bad and others said that it looked "discolored" or "dirty". Indeed, in some areas of the country with highly mineralized local water supplies, consumption of bottled water is not considered a status symbol but a necessity. In other areas, mainly major cities, the finished water meets acceptable taste and turbidity standards, but old and corroded piping systems contribute chemicals and colors which render the water unsuitable for drinking by many people's standards.

Which leads to another reason, and perhaps the most important reason for the change to bottled drinking water. In the same Gallup poll mentioned previously, three quarters of the people polled believed that water pollution posed a serious health threat. Their fears were substantiated by a 1970 EPA study of community water supplies

which revealed health hazards in many community supplies. Later EPA studies also discovered potentially hazardous levels of carcinogenic chemicals in the municipal supplies of some major cities. The results of these reports lead to public distrust of municipal drinking water supplies, once proclaimed as the best in the world, and to an increase in consumption of bottled water.

Americans seeking an alternative to tap water need not look far. Besides imported water, there are domestic water bottlers in nearly every state (Appendix A). However, According to a 1974 EPA report, of the more than 500 brands available at the time, perhaps as many as half were merely reprocessed tap water. Because of this, consumers should be very attentive to the wording on the labels of bottled water. The American Bottled Water Association, which represents a large proportion of the producers of bottled water, distinguish four different categories of bottled water: springwater, wellwater, purified water, and drinking water. Springwater is water which issues from the ground naturally without aid of drilling or pumping. It can be either carbonated or non-carbonated (still). Wellwater is water from an underground source brought to the surface by aid of pumping. Purified water ~~is water~~ is water which has been demineralized by distillation or by deionization. Drinking water may be any water prepared for human consumption, but the water must meet USPHS standards. However, a single visit to any local supermarket or health food store will reveal vast discrepancies in the classification of bottled water. Many of the bottlers do not define their products according to the ABWA definitions, many do not list the source of the water or the chemical content, and many use misleading or vague titles on the labels such as "spring-type" or "natural".

The discrepancies which are apparent in labeling reflect even greater discrepancies in water quality and bottling practices by the manufacturers. Regulations concerning bottled water are at best nebulous and enforcement of these regulations is nearly nonexistent. Because the water is sold for human consumption, it comes under the jurisdiction of the Food and Drug Administration. However, up to 1974, the FDA had not established uniform standards of quality nor did it have a routine program of surveillance of the industry.

Although Congress has now created standards for bottled water that are similar to the ones set for tap water, the FDA lacks adequate manpower to inspect all bottling companies regularly; and often the agency must rely on the companies' own records. Also, if manufacturers label their product "mineral water", it escapes being tested altogether, for the term has not been legally defined. Furthermore, the government cannot monitor local bottlers that do not sell their product across state lines (Diamond, pg. 59). State regulations vary widely from being very specific to being nonexistent. A list of states and their regulations appear in appendix B.

The American Bottled Water Association also sets standards with which their members comply voluntarily. However, the ABWA has no powers of enforcement. If a member bottler does not meet acceptable standards, the Association withdraws its certification of that particular bottler. But the withdrawal of certification does not stop the production or sale of the water. (ABWA regulations, Appendix D)

Because of the lack of enforcement of regulations concerning bottled water, the Environmental Protection Agency undertook a pilot survey in 1972 to determine the quality and health surveillance being provided by the manufacturers. Bottlers were selected from four states: California, Connecticut, Ohio, and Texas. These states were chosen according to a number of criteria: the state's willingness to coope-

rate, representation of both members and non-members of the ABWA, and representation of states having both good and poor bottling regulations. The bottlers that were tested are listed in Appendix C.

The EPA study revealed the following:

1) Eight percent of the bottled water samples evidenced the presence of the coliform organism, which is an indicator of the potential presence of pathogenic bacteria. High standard plate counts gave additional evidence of contamination. (Bacteriological results listed in Table I.)

2) Gross changes in the standard plate counts were noted in the twenty-five samples that were examined during a sixty-three day storage test. While the bacteria counts of six samples remained at of near zero for the entire test period, four rose to levels "too numerous to count", while the remainder fluctuated widely with no definite, discernable pattern. (Results listed in Table II.)

3) While only one sample exceeded a mandatory Drinking Water Standards limit for chemicals, discrepancies were found between the actual chemical composition and that stated by the label in several cases. (Chemical analyses listed in Tables III and IV.)

4) Quality control measures were generally deficient in that bacteriological and chemical analyses of the bottled were not regularly performed. Bacteriological surveillance was judged inadequate in over half of the firms inspected while chemical surveillance was inadequate in almost all cases.

   a) Only eleven of the twenty-five bottlers collected four of more bacteriological samples per month. Three bottlers did not collect any samples for bacteriological analysis, and eight others collected only one sample per month.

   b) None of the twenty-five bottlers reported ever having a complete chemical analysis of their bottled water. Only twelve

> bottlers reported a partial analysis for chemical constituents. Only four of these twelve reported a partial analysis more frequently than once a year.

5) Based upon criteria covering eight sanitation categories...it was found that in many cases bottling was not performed under sanitary conditions. While deficiencies were found in all facilities surveyed, one-half of the firms failed to comply with five or more of the eight categories examined.

Because of the results of the survey, the Environmental Protection Agency made recommendations to the appropriate Federal and State regulatory agencies to develop uniform regulations and systematic surveillance of bottling plants to ensure compliance with the regulations.

On the state level, California has taken the forefront in enacting stricter regulations concerning chemical content and labeling practices of bottled water. California's new regulations were issued in July of 1978 and led to recall, wide-spread re-labeling and threatened prohibition of at least one brand. Tests in California showed that several mineral waters contained fewer minerals than tap water. Under California regulations, beverages labeled "mineral water" must contain at least five hundred parts per million of dissolved solids, the maximum level for bottled water set by the FDA. Eight of the twenty-five waters tested by the California Health Service Department contained fewer solids than that, so the bottlers were required to take "mineral" off their labels. Also as a result of the tests, thousands of bottles of Calistoga were found to be contaminated with a "bacterial amorphous mass" and were recalled. Still another brand, Vichy Etat Celestins of France, exceeded California's fluoride limits, and was ordered to reformulate or stop selling its product in California. California also

charges a five hundred dollar initial licensing fee to bottlers selling in the state to help support its control program. (Business Week, 1979, pg. 122).

Following California's lead, New York, New Jersey, Michigan, and Maine issued their own revised regulations in 1979 and Pennsylvania enacted stricter enforcement of existing regulations. Still, the states with adequate regulations are in the minority and the effectiveness of enforcement of these regulations is still questionable even in the states with revised regulations.

From the results of the quality tests and the review of the current regulations, it is fairly easy to conclude that the majority of bottled water manufactured in this country is of poorer quality than most municipal supplies. The greatest deficiency appears to be in the bacteriological quality of the bottled water. Some of the raw water tested showed signs of contamination by sewage, and the growth of bacteria during storage appears to be a major problem. Until the appropriate governmental agencies enact stricter surveillance of the bottled water industry, the quality of the water is questionable.

TABLE I - Bacteriological results after less than 30 hours storage

Bottler no.		Organisms per 100 ml. Colif.	F. Colif.	Pseudo	Standard plate count per ml.
1	Raw	1	0	0	1,570
	Bottled	3	0	0	630
2	Raw	0	0	0	0
	Treated, tap	0	0	0	800
	Treated, bottle	0	0	0	670
3	Raw	0	0	0	0
	Treated, tap	0	0	0	0
	Treated, bottle	0	0	0	9
4	Raw	0	0	0	0
	Treated, bottle	0	0	0	126
5	Raw	0	0	0	3
	Treated, tap	0	0	0	230
	Treated, bottle	0	0	0	1,180
6	Treated, tap	0	0	0	19
7	Raw	0	0	0	0
	Treated, tap	60	0	0	11
	Treated, bottle	2	0	0	2
8	Raw	0	0	0	14
	Treated, tap	0	0	0	0
	Treated, bottle	0	0	0	0
9	Treated, bottle	0	0	0	0
10	Raw	4	4	4	52
	Treated, bottle	0	0	0	2
11	Raw	0	0	0	0
	Treated, bottle	0	0	0	0
12	Raw	0	0	0	0
	Treated, tap	0	0	0	TNTC
	Treated, bottle	0	0	0	5
13	Raw	0	0	0	TNTC
	Treated, tap	0	0	0	1
	Treated, bottle	0	0	0	8

TNTC=Too numerous to count

TABLE I - Continued

	Bottler no.	Organisms per 100 ml. Colif.	F. Colif.	Pseudo	Standard plate count per ml.
14	Raw	0	0	0	8
	Treated, tap	0	0	0	TNTC
	Treated, bottle	1	1	0	3,000
15	Raw	0	0	0	250
	Treated, bottle	0	0	0	300
16	Raw	0	0	0	0
	Treated, tap	0	0	0	0
	Treated, bottle	0	0	0	0
17	Raw	0	0	0	0
	Treated, tap	0	0	0	300
	Treated, bottle	0	0	0	1,100
18	Raw	0	0	0	740
	Treated, bottle	0	0	0	3
19	Treated, bottle	0	0	0	0
20	Treated, tap	0	0	0	0
21	Treated, bottle	0	0	0	2
22	Treated, bottle	0	0	0	1
23	Raw	0	0	0	210
	Treated, bottle (1)	0	0	0	4,000
	Treated, bottle (2)	0	0	0	770
24	Raw	0	0	0	38
	Treated, bottle	0	0	0	0
25	Treated, bottle	0	0	0	3

TABLE II

Effect of Storage on the Standard Plate Count* of Various Bottled Waters

Storage period (days)	Bottler # / Sample #	1 / 13255	2 / 9347	3 / 9350	4 / 13253	5 / 9344	7 / 13298	8 / 13183	8 / 13184
1		630	670	9	126	1180	4	2	3
3		370	2160	1000	5000	143	20,000	350	18,000
5		630	210	2500	47,000	150	52,000	250	21,000
7		1120	360	6100	40,000	146	43,000	1300	11,000
10		379	5360	9000	32,100	129	76,000	670	70,000
14		1380	3900	2380	31,200	95	47,000	710	18,000
21		1440	9000	1430	43,000	11	40,000	1700	13,000
28		760	17,700	1010	32,000	71	35,000	2100	7200
35		460	41,200	690	14,200	69	33,000	1400	4400
49		550	2300	510	6000	70	48,000	4900	660
63		430	1700	430	11,700	13	61,000	1200	490

Storage period (days)	Bottler # / Sample #	9 / 13279	9 / 13280	10 / 13292	12 / 12005	12 / 12099	18 / 13321	19 / 13308	13 / 12095
1		1	1	3	60	1	0	0	14
3		5	3	4	140	0	3	0	15
5		31	39	4	250	2	34	0	110
7		36	25	69	1500	0	24,000	0	150
10		130	7	2700	1200	0	160,000	0	130
14		1100	39	29,000	1200	0	130,000	0	140
21		2200	1200	100,000	1500	0	49,000	0	140
28		1200	1300	53,000	750	0	44,000	0	310
35		690	880	56,000	600	0	18,000	1	100
49		700	1100	46,000	500	0	13,000	0	85
63		240	360	44,000	600	0	5800	0	85

*Average counts per ml. calculated from replicate plates, incubated for 48 or 72 hours at 35 degrees C, using plate count agar.
LA= Laboratory accident
TNTC= Too numerous to count, at 0.01 dilution.

TABLE II (continued)

Storage period (days)	Bottler #	14	14	15	15	17	19	15
	Sample #	14805	14808	14813	14817	14809	13332	14813
1		TNTC	625	0	550	TNTC	0	0
3		TNTC	240	0	800	TNTC	0	0
5		TNTC	150	0	TNTC	TNTC	0	0
7		640	400	0	TNTC	1100	0	0
10		200	750	0	TNTC	1100	0	0
14		140	TNTC	0	TNTC	950	0	0
21		90	TNTC	0	TNTC	1000	0	0
28		35	TNTC	0	TNTC	800	0	0
35		50	TNTC	0	TNTC	915	0	0
49		65	415	0	1300	520	0	0
63		70	510	0	720	400	0	0

Storage period (days)	Bottler #	21	22	23	24	25
	Sample #	13309	13312	13328	13305	13324
1		1	0	1300	1	350
3		1	LA	3300	0	160,000
5		2	0	19,000	4	400,000
7		1	0	29,000	3	550,000
10		5	0	33,000	2	480,000
14		10,000	0	31,000	180	370,000
21		15,000	0	28,000	5100	260,000
28		5500	0	27,000	5300	170,000
35		4600	0	11,000	2500	110,000
49		2200	0	5600	3800	57,000
63		130	0	7000	1500	67,000

*Average counts per ml Calculted from replicate plates, incubated for 48 or 72 hours at 35 degrees C, using plate count agar.
LA= Laboratory accident
TNTC= Too numerous to count, at 0.01 dilution.

TABLE III

Results of Chemical Analysis of Bottled Water, in Parts per Million

Sample no.	TDS (500)*	Cl (250)*	SO_4 (250)*	NO_3 (45)*	Ca (1.0)*	Mg (0.05)*
13287	282	7	38	25.3	0.009	0.002
13289	18	5	1	0.7	0.236	0.001
13291	39	5	1	0.1	0.008	0.000
13282	18	5	1	0.4	0.021	0.001
13283	14	5	1	0.4	0.0i6	0.001
13285	326	5	122	0.7	0.054	0.002
13294	556	5	67	19.5	0.021	0.001
12094	8	5	1	0.1	0.032	0.001
12097	112	5	5	0.2	0.056	0.031
12098	12	5	1	0.1	0.033	0.001
14801	350	29	1	0.3	0.045	0.002
14804	11	5	1	0.1	0.031	0.001
14807	410	140	1	0.2	0.125	0.011
14811	18	5	1	0.8	0.480	0.002
14816	176	14	33	1.2	0.021	0.003
13310	166	18	36	17.7	0.053	0.001
13311	11	5	1	1.0	0.033	0.000
13313	102	5	1	3.4	0.045	0.000
13314	6	5	1	0.9	0.064	0.000
13315	19	5	1	0.8	0.061	0.000
13330	18	5	1	1.4	0.730	0.001
13301	509	20	100	32.8	0.160	0.004
13302	7	5	1	0.2	0.045	0.000
13316	12	5	1	0.7	0.113	0.000
13317	190	15	4	0.8	0.064	0.001
13318	58	5	1	1.0	0.071	0.009
13319	7	5	1	0.7	0.052	0.000
13323	257	10	35	12.4	0.030	
13325	591	11	145	44.3	0.198	0.003
13326	16	5	1	0.8	0.187	0.000
9341	491	40	1	2.3	0.122	0.002
9345	165	5	26	32.8	0.011	0.002
9348	180	5	14	9.8	0.014	0.001
13249	189	10	17	2.7	1.060	0.040
13250	16	5	1	0.8	0.016	0.002
13251	15	5	1	0.9	0.014	0.002
13254	66	5	11	7.1	0.400	0.003

* =recommended
** = mandatory

TABLE III (continued)

Sample no.	Pb (0.05)**	Fe (0.3)*	Zn (5.0)*	Hg	As (0.01)* (0.05)**
13287	0.025	0.016	0.049	0.5714	0.00
13289	0.008	0.010	0.123	0.1918	0.00
13291	0.010	0.013	0.044	0.1865	0.00
13282	0.019	0.013	0.044	0.0355	0.00
13283	0.019	0.010	0.047	0.0000	0.00
13285	0.028	0.014	0.075	0.0421	0.00
13294	0.015	0.020	0.014	0.0329	0.00
12094	0.002	0.021	0.034	0.0640	0.00
12097	0.008	0.057	0.029	0.0000	0.00
12098	0.065	0.055	0.009	0.0000	0.00
14801	0.008	0.014	0.064	0.0000	0.00
14804	0.000	0.013	0.010	0.0640	0.00
14807	0.044	0.068	0.199	0.0000	0.00
14811	0.034	0.046	0.130	0.0000	0.00
14816	0.012	0.035	0.079	0.2933	0.00
13310	0,010	0.016	0.049	0.0000	0.03
13311	0.004	0.014	0.012	0.0000	0.00
13313	0.006	0.017	0.015	0.0000	0.00
13314	0.005	0.014	0.015	0.0000	0.00
13315	0.003	0.011	0.014	0.0000	0.03
13300	0.005	0.009	0.198	0.0000	0.03
13301	0.018	0.028	0.068	0.0000	0.03
13302	0.004	0.016	0.012	0.0000	0.03
13316	0.005	0.013	0.032	0.0000	0.03
13317	0.009	0.021	0.012	0.0068	0.00
13318	0.005	2.750	0.044	0.0000	0.00
13319	0.003	0.016	0.012	0.0000	0.03
13323	0.009	0.013	0.176	0.0000	0.03
13325	0.030	0.021	0.027	0.0000	0.03
13326	0.007	0.020	0.026	0.0000	0.03
9341	0.016	0.019	0.033	0.0171	0.00
9345	0.012	0.035	0.159	0.0267	0.00
9348	0.012	0.001	0.039	0.0000	0.00
13249	0.024	0.037	0.099	0.0000	0.00
13250	0.004	0.060	0.016	0.0000	0.00
13251	0.004	0.103	0.017	0.0000	0.00
13254	0.012	0.010	0.203	0.0000	0.00

* =recommended
** =mandatory

TABLE IV - Fluoride determination of bottled water samples

Bottler no.	Sample no.	F. mg/liter
1	13255	0.095
2	9347	0.077
3	9350	0.155
4	13253	0.070
5	9344	0.095
12	12005	0.130
12	12099	0.120
13	12095	0.095
14	14805	0.250
14	14808	0.370
15	14813	0.095
15	14817	0.125
16	14819	0.110
17	14809	0.071
18	13321	0.340
19	13308	0.135
19	13322	0.180
21	13309	0.280
22	13312	0.260
23	13328	0.370
24	13303	0.510
25	13324	0.660

APPENDIX A

GEOGRAPHICAL DISTRIBUTION OF WATER BOTTLERS IN THE U.S., BY STATE

State	No. of Bottlers
Alabama	0 (c)
Alaska	Unknown
Arizona	5 (c)
Arkansas	11 (c)
California	63 (c)
Colorado	4 (c)
Connecticut	17 (a)
Delaware	2 (c)*
District of Columbia	0 (c)
Florida	24 (c)
Georgia	2 (c)
Hawaii	2 (c)
Idaho	1 (c)
Illinois	50 (b)
Indiana	Unknown **
Iowa	Unknown
Kansas	20-25 (b)
Kentucky	2 (c)
Louisiana	5 (c)
Maine	15-20 (b)
Maryland	12 (a)
Massachsetts	16 (a)
Michigan	Unknown **
Minnesota	3 (b)
Mississippi	2 (c)
Missouri	15 (a)
Montana	8 (c)
Nebraska	1 (c)
Nevada	6 (c)
New Hampshire	2 (a)
New Jersey	21 (a)
New Mexico	1 (c)
New York	16 (a)
North Carolina	7 (c)
North Dakota	3 (c)
Ohio	50 (b)
Oklahoma	13 (a)
Oregon	4 (c)

(a) Licensed, registered, or certified by the state.
(b) Estimated by state health agriculture department or by EPA regional office.
(c) Known according to state to be in operation.
* (Plus approximately five who bottle only in emergencies.)
** (Estimated twenty to thirty Indiana and Michigan combined.)

Appendix A (continued)

State	No. of bottlers
Pennsylvania	43 (a)
Rhode Island	4 or 5 (b)
South Carolina	0 (c)
South Dakota	2 (c)
Tennessee	1 (c)
Texas	50 (b)
Utah	1 (c)
Vermont	1 (c)
Virginia	12 (c)
Washington	3 (c)
West Virginia	8 (c)
Wisconsin	5 (b)
Wyoming	2 (c)

APPENDIX B

STATE REGULATIONS PERTAINING TO THE QUALITY OF BOTTLED WATER, 1971

1. ALASKA- No regulations specifically pertaining to bottled water. Handled under State Water Supply regulations or general public health powers.
2. ALABAMA- No specific regulations.
3. ARIZONA- No regulations specifically pertaining to bottled water, but handled under State Water Supply regulations and Food statutes.
4. ARKANSAS- The water source must meet the requirement of the Arkansas State Board of Health. (Rules and Regulations pertaining to Bottling Plants, adopted 1962.)
5. CALIFORNIA- Water must be free from coliform, fluoride may be added, and label must not be false or misleading. (California Administrative Code, Title 17, Public Health, 1953, and California Pure Foods Act, 1968.)
6. COLORADO- Quality of bottled water shall conform to same standards as required for public water supplies- substantially the same as USPHS Drinking Water Standards, 1962. (Regulations for Quality of Water Supplies to the Public, 1967.)
7. CONNECTICUT- "No impure, contaminated or polluted water shall be used ..." (An Act Concerning Non-Alcoholic Beverages and Apple Juice, and Regulations Concerning Dietary Beverages- Apple Cider and Apple Juice, 1967, Department of Consumer Protection).
8. DELAWARE- No specific regulations pertaining to bottled water.
9. DISTRICT OF COLUMBIA- Importation of packaged food forbidden unless it comes from an inspected and approved source. No regulations pertaining specifically to bottled water. (D. C. regulations S-6: 105).
10. FLORIDA- Source must be approved by Florida State Board of Health. Bacteriological quality must be in accordance with the Florida Sanitary Code, chemical analysis filed with Board for approval, and the label must give the chemical analysis and a statement of all substances added and treatment processes applied. (The Sanitary Code of Florida, Chapter 1700-22.)
11. GEORGIA- Bottlers or importer of waters must register with the Georgia State Health Department and have a bacteriological examination, and chemical analysis, if required, of the water by the State Board of Health Laboratory. At least one bottled sample must be submitted every month for bacteriological examination as to purity. (Rules of Department of Public Health, Chapter 270-5-14, adopted 1928.)
12. GUAM- No regulations specifically pertaining to bottled water.
13. HAWAII- No specific regulations, but the Hawaii Food, Drug, and Cosmetic Act applies. The Adulteration or misleading of food is prohibited. (Hawaii Food, Drug, and Cosmetic Act, 1967.)

APPENDIX B (continued)

14. IDAHO- No specific regulations, but all water must come from approved sources, and when bottled, meet the USPHS standards for drinking water and be bottled under sanitary conditions.
15. ILLINOIS- Water shall be of safe, sanitary quality from an approved source in conformance with applicable state and local laws, ordinances and regulations. (Food Manufacturing, Processing, Packing or Holding, General Rules and Regulations, with Interpretive Regulations for Bottlers of Soft Drinks and Waters, 1970).
16. INDIANA- No Bottled water offered for sale may show bacteriological or chemical content deleterious to public health. Samples must be submitted for potability and suitability at intervals designated by the state board. (Water Supply, Chapter 157, Acts of 1949 Indiana General Assembly.)
17. IOWA- Iowa Department of Agriculture has jurisdiction, and classes bottled water as a food. Although regulations do not specifically mention water, it is sampled and examined for potability by Iowa Department of Agriculture Laboratory. (State of Iowa Pure Food Laws, 1966.)
18. KANSAS- No specific regulations. Kansas Food, Drug, and Cosmetic Act applies. (Similar to Federal FD&C Act.) Unless label indicates industrial or commercial use, drinking water standards apply. Label must be factual. (Kansas Food, Drug, and Cosmetic Act of 1953, with ammendmentsand regulations.)
19. KENTUCKY- No specific regulations, but bottled water must meet same requirements as public water supplies, i.e., chlorination, approval relative to treatment, chemical and bacteriological quality, approval relative to proper labeling, etc. (Kentucky Public Water Supply Regulations.)
20. LOUISIANA- Bottled water must be free from substances deleterious to health and shall conform to standards of the Louisiana State Board of Health for potable water. It must be labeled according to the State Food, Drug, and Cosmetic Act. (Sanitary Code, State of Louisiana, Chapter IV, Bottled Water and Other Bottled Carbonated Beverages, 1963, the State Food, Drug and Cosmetic Act, 1950, and General Regulations Pertaining to Foods, 1944).
21. MAINE- No specific regulations, but Health and Welfare Statute on the sale of water for domestic purposes applies. Samples may be required for chemical and bacteriological examination, and the sale or distribution of contaminated, polluted, or unfit water may be prohibited. (Health and Welfare Statute, Chapter 359, Water for Homes or Schools.)
22. MARYLAND- No specific regulations, but laws pertaining to food and drink apply. Licenses to manufacture soft drinks are required, and may be denied if the water supply is known to be dangerously polluted. (Health Laws, Art. 43.)
23. MASSACHUSETTS- No ingredient or material, including water, shall be used in manufacture or bottling which is contaminated or injurious to health. If the water supply is not a public supply, a description of the spring and an analysis of the

APPENDIX B (continued)

water must accompany the permit application. (Laws and Regulations Pertaining to the Manufacture and Bottling of Carbonated Non-Alcoholic Beverages, Soda Water, Mineral and Spring Water. General Laws, Chapter 94, as amended by Chapter 441 of the Acts of 1935.)

24. MICHIGAN- Regulations pertaining to non-alcoholic beverages and food apply. Only reference to water says it must meet USPHS standards for bacteriological purity. (Michigan Dept. of Agriculture, Regulation No. 549, Non-Alcoholic Beverages, Michigan Food Law of 1968, Act 39 of 1968 as amended.)

25. MINNESOTA- Regulations pertaining to non-alcoholic beverages apply. Water used must be of safe, sanitary quality and from an approved source. (State of Minnesota Department of Agriculture Rules and Regulations Relating to Non-Alcoholic Beverages. Agr 985-994, Non-alcoholic Beverages, Chapter 34.)

26. MISSISSIPPI- No specific regulations (bottling facilities are inspected by local or county authorities).

27. MISSOURI- Laws and regulations pertaining to soft drinks apply. No material which is not pure, clean or wholesome may be used in manufacture. Water must be from an approved source and of sanitary quality as required by Division of Health standards. No fluorides may be added. (Laws Governing the Manufacture of Soft Drinks and Beverages in Missouri, Missouri Revised Statutes, 1949).

28. MONTANA- Annual fee for bottling plants, water plant and source shall be inspected at least once each year. (Investigation of Water Offered for Sale in Bottles and Other Containers, Regulations 79, 1918.)

29. NEBRASKA- No specific regulations, but rules and regulations for public water supplies are interpreted as applicable. Essentially the USPHS Drinking Water Standards of 1946 are the standards for chemical and bacteriological quality. (Rules and Regulations Relating to Public Health, Section XI, Water Supply Systems.)

30. NEVADA- Permit required for bottling or distribution, and permit issued only after compliance with water supply regulations, USPHS Drinking Water Standards and Nevada Food and Drink Establishment Act. (State of Nevada, Department of Health, Water Supply Regulations, 1967.)

31. NEW HAMPSHIRE- No impure water or unsafe source of water supply shall be used. All materials, including water, shall be pure and wholesome. (State of New Hampshire, Division of Pubic Health Services, Beverage Law and Regulations, 1967.)

32. NEW JERSEY- All water intended for distribution or sale as bottled water shall comply with the potable water standards established by the Department of Health. (Laws and Regulations Governing the Sale of Non-alcoholic Beverages and Bottled Water.)

33. NEW MEXICO- No specific regulations, but New Mexico Food Act applies. Wording similar to Federal Food, Drug and Cosmetic Act. (New Mexico Food Act, Chapter 169, Laws of 1951.)

APPENDIX B (continued)

34. NEW YORK- Bottled water, except mineral, must comply with New York State Drinking Water Standards, State Sanitary Code for drinking water supplies applies. Bottled water cannot be sold unless the source, equipment and method of handling are approved by the State Commissioner of Health. (New York State Sanitary Code, Part 5, Drinking Water Supplies, 1967, and Public Water Supply Guide, 1971.)
35. NORTH CAROLINA- Bottled Water must be safe for consumption and properly labeled. Supplier must take precaution for to protect its purity. Samples must be submitted for bacteriological analysis. (North Carolina General Statutes 130-158, 130-131, 160-120 to 160-132.)
36. NORTH DAKOTA- Bottled water cannot be sold until the source of supply, equipment and method of handling have been approved by the State Department of Health. The State Laboratories Department (not connected to the State Health Department) registers companies which sell bottled water. State Health Department regulations do not apply to waters sold in labeled registered by the State Laboratories Department. (State Health Department Regulations NO. 69.)
37. OHIO- Bottled water classed as soft drink in Agriculture regulation. All water used shall be safe potable water free from pathogenic bacteria. Label must not be misleading. Prepared or compounded waters shall not be described as natural waters. Mineral waters must be of good quality when judged by sanitary chemical analysis. (Ohio Revised Code, Sections 913.22 to 913.28 and Section 913.99.)
38. OKLAHOMA- Except for mineralized water, the water shall comply with the USPHS Drinking Water Standards for chemical quality and frequency of analysis. Not less than two samples per month shall be tested for bacteriological quality. (Oklahoma State Department of Health Rules and Regulations for the Production, Processing and Distribution of Bottled Drinking Water, 1963, Oklahoma Senate Bill NO. 292, 1961.)
39. OREGON- No specific regulations, but Department of Agriculture food law applies. Bottling plant must meet minimum conditions required for any food processing plant, and water must be potable.
40. PENNSYLVANIA- No bottled water may be sold which is impure, bears evidence of potential pollution, or the use of which will be injurious or detrimental to the public health. Permit application must be accompanied by a report of bacteriological analysis and sanitary chemical analysis. (Act No. 396 of the Pennsylvania General Assembly, 1929, Commonwealth of Pennsylvania Department of Health Regulations pertaining to the Manufacturing, Bottling, and Selling of Certain Waters, Chapter 4, Art. 421, 1959.)
41. RHODE ISLAND - Regulations specify sanitary conditions for bottling facilities and bottles, but no quality standards for water. (State of Rhode Island and Providence Plantations Department of Health, Division of Food and Drug Control,

APPENDIX B (continued)

Chapter 21-23.)
42. SOUTH CAROLINA - No specific regulations, but bottled water is included in the defintion of "Public Water Supply."
43. SOUTH DAKOTA- No specific regulations, but State Dept. of Agriculture laws apply. Foods must not be adulterated or misbranded. All beverages, including bottled water, must meet the same purity standards as food. (South Dakota State Department of Agriculture Laws, 22.0401 to 22.0411, 22.0994 to 22.9905, 22.0901 to 22.0905, 22.0916.)
44. TENNESSEE - No specific regulations, but Agriculture Department requires that bottled water meet the USPHS Drinking Water Standards.
45. TEXAS - All water must conform with chemical quality limits prescribed in USPHS Drinking Water Standards. Mineral water, however, need not meet mineral concentrations prescribed in standards. Samples are to be submitted for bacteriological analysis every two weeks. (Texas State Board of Health Minimum Standards for Production, Processing, and Distribution of Bottled Drinking Water, 1952.)
46. UTAH - No specific provision in the State Code, but distributors must be licensed and licensing code requires periodic laboratory evaluation to insurethat the water meets standards for purity.
47. VERMONT - Bottled water shall meet USPHS Drinking Water Standards and be free from coliforms. It shall not have total bacteria count of more than 100 organisms per ml in not more than 10% of samples. (Vermont Health Regulations, Chapter 5, Subchapter 12, effective 1/26/61.)
48. VIRGINIA - Specific regulations for bottling plants but none for water quality. Vitginia Food laws prohibit sale of food or drink which is unwholesome or otherwise unfit for human consumption. (Vitginia Department of Agriculture and Immigration, 1954, Virginia Food Laws, 1968).
49. Washington - Bottled waters must be of sanitary quality, approved by the State Director of Health. (Rules and Regulations of the State of Washington Board of Health, Chapter 50, 1960.)
50. West Virginia - Bottled water must meet the same requirements as public water supplies which are essentially the same as the USPHS Drinking Water Standards. At least one sample per week must be submitted for a bacteriological anaylis. (West Virginia State Board of Health, Public Water Supply Regulations, 1969.)
51. Wisconsin - Bottled water classed as Soda Water Beverage by Wisconson Department of Agriculture. All water must be pure and free from pollution and contamination. (Wisconsin Statutes, Chapter 97, 1969, Wisconsin Department of Agriculture of Statutes, Chapter AG. 41.)
52. Wyoming - Bottled classed as food by State Department of Agriculture. Food must not be adulterated or misbranded. (Wyoming General Food, Drug and Cosmetic Laws, Vol. 8, Chapter 5, Articles 1-9, inclusive, Wyoming Compiled Statutes, 1957.)

APPENDIX C
BOTTLERS VISITED

Connecticut
*Pequot Springs Water Co., Glastonbury
*Triple Springs Spring Water, Meriden
*Great Bear Spring Co., Hampden
*Kelsey Spring Water Co., Middletown
Granite Springs Beverage Co., Thornton
*Manitock Spring Water Co., Waterford

Texas
*Ozarks-Houston, Inc., Houston
*Houston Distilled Water Co., Houston
*Galveston Distilled Water Co., Galveston
*Triple XXX Bottling Co., Galveston
*Crysts Pure, Inc., Houston
Brazosport Bottling Co., Freeport

California
El Rancho Markets, Inc., San Gabriel
*Deep Rock Water Co., Los Angeles
*Indian Head Water Co., Los Angeles
*Arrowhead Puritas Waters, Orange
*Silver Springs Water, Inc., Orange
*Niagara Drinking Waters, Inc., Garden Grove
*Arrowhead-Puritas Drinking Water, Los Angeles
*Sparkletts Drinking Water Corp., Gardens

Ohio
Cedar Hill Farms, Inc., Cincinnati
Talawanda Spring Inc., College Corner
*The Crystal Water Co., Dayton
Burger Brewing Co., Cincinnati
Vanderhaar Bros. Dairy, Inc., Evendale

*Indicates membership in ABWA

APPENDIX D

AMERICAN BOTTLED WATER ASSOCIATION

GOOD BOTTLING PRACTICES GUIDELINES (INTERIM) BOTTLED OR PACKAGED DRINKING WATER PRODUCTION, PROCESSING, AND PACKAGING Rev 6/1/71

The members of ABWA are joined as an association for the purpose of the advancement of the operations of the member companies, and the continuing improvement of service and products to the public.

The Good Bottling Practices Guidelines Program in being instituted to improve quality and service, and to inform the buying public of the high standards of quality and excellence that are to be maintained.

The Guidelines will be the basis of the production, processing, and packaging qualifications and the basis for plant approval upon recommendations by the Production Consultant. The first survey will be on the basis of satisfactory compliance with the Guidelines that control mineral content, cleanliness, sterility, and bacteria of the packaged products. As the program progresses, additional guidelines may be added to the list governing approval.

The Production Consultant will recommend approval when the annual survey reveals justification. Approval will be continued as long as a plant meets the guidelines. Whenever a plant fails to pass survey, the approval may be withdrawn. All approvals and withdrawals will be authorized by the ABWA Board of Directors. The Consultant has authority to recommend to the Board only. He has no authority to issue the seal of approval, nor to withdraw the seal of approval.

1. PERMITS

A. No person shall bottle or package water to be sold or distributed without first having obtained a permit from the appropriate governmental agency. This could be state, county, or city, or a combination thereof. Local regulations will dictate the need. This does not apply where no permit is required.

B. No water bottled or packaged in other states shall be sold, offered, or exposed for sale, or held in possession with intent to sell within a state unless the source is forst inspected and registered and a proper permitobtained from the regulatory authorities.

2. WATER

A. Source. All natural waters to be bottled or packaged, or to be distilled or deionized must be procured from a source approved by the governmental agency issuing the permit, or the agency with jurisdiction.

B. Bottled or Packaged.

These products are to include natural spring

well, or other water, distilled water, deionized water, or any or the foregoing to which chemicals have been added which is placed in sealed bottles, packages, or other containers to be sold for culinary or other domestic purposes involving a likelihood of the water being ingested by human beings.

2. All of the products that are described in B-1 are to comply with the Drinking Water Standards of the U.S. Department of Health, Education, and Welfare Public Health Service. Where local regulations are more stringent, they will take precedence in those particular stipulations. At all times, the strictest articles of regulations shall be observed. A complete quantitative chemical analysis of each type of water to be sold shall be made semianually by an approved laboratory.

3. The ABWA Guideline for demineralized water by distillation, deionization, or other methods is that it shall contain no more than 5.0 ppm of total solids.

4. U.S.P.H.S. Drinking Water Standards will be the basic bacterial standards for all bottled and packaged waters that are distributed for human consumption in the U.S.A.

5. The ABWA Guideline for waters offered for sale shall be that they are free from coliform organisms and have plate counts of less than 100 per milliliter. The standard plate count may not be exceeded in more than ten percent of the samples collected.

6. Unopened bottles or packages will be delivered to a governmental laboratory or an independent laboratory having the approval of the governmental agency which issues the permit to the plant, or such agency may obtain samples with their own personnel direct from plant or truck. When samples are to be tested by governmental laboratories, it is preferable but not mandatory to have the samples collected by representatives of the respective laboratories. Samples will be taken from the containers in the laboratory by the laboratory technician. Samples may not be transferred from company bottles to laboratory sample bottles on the street or in other locations where the air is unsanitary. A minimum of one bacterial test will be made of each package once each month.

7. Member companies may perform the tests that are stipulated in the last sentence of B-6 using the Millipore system or other method approved by the Board. Sampling of each package should be performed at least semianually by a certified commercial laboratory.

8. To be eligible for the Good Bottling Practices Seal of Approval, a plant must have complied with the ABWA Guidelines as stated in B-2,3,5,6 and 7 for a period of one year or since the most recent previous survey. It is assumed that governmental agencies will continue to sample the products and that results of these tests will comply with ABWA Guidelines. These agencies will not

be required to test for total counts.

9. When ozone is used as a sterilant of bottled water, the water in glass bottles should have an ozone residual of not less than 0.05 ppm when the bottles are closed and in plastic bottles not less than 0.07 ppm.

C. Processing. Water to be used in a plant for bottle washing, hand washing, plant cleanup, and other sanitary purposes shall be delivered to the operating areas of the plant, under pressure, from a source that is approved by the governmental agency with jurisdiction control, or the one issuing the permit for the plant operation. This water will be tested monthly so that the owner may know that its use as a bottle rinse and for other critical purposes will not contribute bacteria to the product.

111. BOTTLING PLANT CONSTRUCTION AND SANITATION

A. The floors of all rooms where bottles water or packaged water is processed or bottled, or in which bottles are sanitized shall be smooth, impermeable, and rodent-proof. They may be constructed of ceramic or fire clay tile, cement, concrete or other impervious material. All wet processing areas shall have floors impervious to water and all new floors shall have adequate and sufficient floor drainage to permit thorough cleaning without becoming flooded. Existing floors without proper drainage will be acceptable provided that portable walking surfaces, on which workmen will stand and walk, are used. The walking surfaces are to be removed daily so that puddles may be removed and floors properly cleaned. The floors will be subjected to daily cleaning, following by sanitizing with water of two hundred ppm. strength of chlorine or quaternary ammonium compound. The latter may be applied by mop or spray.

B. The walls and ceilings of all rooms in which bottled water or packaged water is processed shall have smooth and washable surfaces, and shall be finished in a color sufficiently light to give good light reflection. The minimum height for ceilings in such rooms shall be eight feet. The walls and ceilings are to be cleaned semiannualy by scrubbing, using a suitable soap of detergent. Where bottling rooms do not exist and there are no ceilings, the inner surface of the roof supports shall be cleaned at regular intervals and kept free from accumulations of dust and dirt.

C. All rooms in which bottled or packaged waters are prepared, produced, or stored, or in which utensils are washed shall be ventilated so as to prevent excess condensation and corrosion. The ventilation system so designed and used must be located to preclude the intake of dust-laden air.

D. Adequate means shall be provided to exclude crawling insects and rodents from the entire plant and to exclude flying from bottling rooms or areas where

bottle washing, filling, and closing operations are performed and from cooler processing rooms.

E. The entire premises, including floors, walls, ceilings, apparatus, devices, machines, counters, shelves, tables, and other parts of bottling works or facilities, equipment, etc., shall be so constructed and so located as to facilitate easy cleaning, and shall be kept clean and in sanitary condition. It is recommended that all new floors be coved to a height of six inches at junctions with all walls and the radius of the cove be one inch or more. All plans for alterations of existing facilities or for new construction must be reviewed and approved by the governmental agency issuing the permit for the plant and it is suggested that the plans be submitted to the ABWA Prodution Consultant for review and recommendations.

F. Adequate and convenient toilets shall be provided which shall be separate and apart from any room or rooms where bottled or packaged waters are processed, or in which bottles or packages are sanitized. Toilet rooms shall be provided with self-closing doors. No toilet room shall be used for the storage of garments, food products, utensils, or packaging and/or wrapping materials. Toilets shall have separate ventilarion flues or adequate windows to the outside air. Lavatories shall be provided with soap (preferably powdered or liquid soap from dispensers-bar soap becomes unsanitary), hot and cold running water, and approved one-use sanitary towels and shall be maintained in clean and sanitary conditions. Toilet room floors shall be of nonabsorbent and impervious material. Floors and fictures will be cleaned and sanitized daily. Sanitizing materials will be as stated in III-A. Walls and ceilings will be kept clean.

G. In all rooms in which bottled or packaged waters are produced or prepared, or in which coolers or utensils are washed, sufficient natural or artificial lighting shall be provided to produce an intensity of not less than fifty foot candles at inspection areas, thirty foot candles in work areas, and five foot candles in storage areas.

H. Every bottling plant shall have an approved sewage disposal system for all sewage and waste water.

I. All tanks used to store product water and all piping used to conduct water to the filling operation shall be of a type which can be cleaned easily, which is non-corrosive, and which will prevent toxic materials in excess of quantities permitted by the U.S. Department of Health, Education, and Welfare, Public Health Service Drinking Water Standards from entering the water being transported. If mor than one source of water is available in the plant, no cross connections shall be permitted between two different water supplies unless approved in writing by the governmental agency having jurisdiction.

Tanks will be tightly enclosed to exclude all foreign matter. Tanks will be vented through inverted air filters.

J. While engaged in the work of processing bottled or packaged water or sanitizing bottles or packages, employees shall wear clean, washable outer garments and paper caps. Rooms shall be provided for the changing and hanging of street apparel apart and separate from the work areas, and such rooms shall be kept clean at all times. All clothes shall be removed from such rooms at intervals to allow thorough cleaning of the room.

K. Tobacco will not be used in any product processing room. Expectorating will not be permitted except into receptacles provided for waste or sewage.

L. Before beginning the work of preparing, mixing, or handling the ingredients used in bottling and packaging, and immediately after visiting a toilet, every person shall wash his hands and arms thoroughly and rinse them in clean water. Appropriate notice to this effect shall be posted in each toilet and dressing room.

M. No employee or other person affected with a disease or infection in a communicable or transmissable stage shall be permitted to work in any bottling or packaging plant, or to handle any of the products or equipment. Health certificates shall be obtained as required by governmental agencies with a jurisdictional control.

N. No work or storage areas of any bottling or packaing plant shall be used for sleeping or other household purposes.

O. No animal or fowl shall be kept or allowed in any bottling works or other place where bottled waters are produced.

IV. SANITIZING OF STORAGE AND BOTTLING EQUIPMENT

Product storage tanks, piping, filling equipment, bottle washers, crowners, and other equipment used to store, transport and package the products sold by members of the Association must be maitained in clean and sanitary condition. A schedule of maintenance, cleaning and sanitizing is a necessity. This activity is one of the most important in the production of high-quality products at reasonable cost.

Records shall be kept by approved plants of all work performed as required by Sections B2 and 3 so that the information will be available to the ABWA surveyor when he makes the annual survey.

A. Maintenance. This is an activity that must be scheduled by each plant operator as the plan must be tailored to the equipment and operating conditions of each plant. The Consultant will advise and counsel.

B. Periodic cleaning and sanitizing. The Guidelines would be excessively voluminous and complex if an attempt were made to creat exact standards to cover all

types of equipment presently in use. A generalization will be made, with a recommendation that each plant operator expand the program to fit the needs of his plant. As the program progresses, more exact and detailed guidelines can be produced.

1. Semiannual

a. Product lines will be inspected for evidence of the formation of scale and the occurrence of oxidation. If conditions justify, the lines will be disassembled, cleaned, and reassembled.

b. Fillers will be completely cleaned.

c. Softeners, charcoal filters, ozone tanks and equipment, soft water tanks, and other associated equipment other product storage tanks will be opened, disassembled, cleaned, and reassembled as necessary.

d. All of the above equipment may be sterilized through the use of chlorinated water of three hundred and fifty ppm. strength with an exposure time of fifteen minutes minimum. Sterile water will be used as rinse water. Ozone treated water will do an effective job of sterilizing tanks, piping, and filters. The ozone residual in the water should be 0.1 ppm. minimum. When piping is sterilized, a residual of 0.05 ppm. should be in the water at all discharge points. Sterilization of softeners and charcoal will be limited by the recommendations of the manufacturers of the materials.

2. Tanks: The types of water that are stored and the linings of the tanks will govern the frequency of the cleaning of the tanks. In some cases weekly scrubbing and cleaning will be necessary. Other conditions will justify longer periods between cleanings. Basically the tanks will be kept clean and sterile. Each tank will be sterilized monthly by application of chlorinated water with a strength of one hundred ppm and an exposure time of twenty minutes or more. Sterile water will be used to rinse the tanks until they are chlorine free. Records will be kept of cleaning and sanitizing activities.

3. Daily:

a. Mechanical hydro bottle washers must be properly timed always. The jets must be kept clear of paper pulp and other obstructions. The washers should be kept as free of label pulp as possible. Outside sprays will be kept in full operation.

b. All product lines between product storage tanks and fillers and all fillers will be sterilized by steam or chlorinated water of two hundred ppm. Product water will be used to rinse the lines until they are chlorine free. Ozone treated water may be used to perform this sterilization as described in IV, B, 1-d.

c. All other bottling equipment such as drowners, filters, etc. will be sterilized by chlori-

nated water of two hundred ppm strength.

d. The use of sponges in containers of quaternary ammonium compound solution of two hundred ppm strength is recommended for placement at all operating stations in the bottling or packaging area. The hands of operators can be kept sterile through the use of this solution. The solution does not irritate the skin as chlorine does.

V. SANITIZING AND FILLING BOTTLES

A. Sanitizing: Before filling, all bottles shall be thoroughly cleaned by washing with an effective cleansing agent in water, the temperature of which is not les that 120 degree F., and shall, in addition, be subjected to an effective bactericidal process. A final rinsing of the inside of bottles, using product water, may be used to remove traces of sterilants. The following bactericidal processes are considered to be effective:

1. Contact of the interior surface of the bottle for at least one-half minute with a chlorine solution containing at least one hundred ppm free chlorine.

2. Contact of the interior surface of the bottle for at least two minutes with a solution containing at least two hundred ppm of an approved quaternary compound. If the detergent used in the cleaning process is a type which would neutralize the quaternary ammonium compound, the a clear water rinse shall be used before application of the quaternary ammonium compound.

3. Contact of the interior surface of the bottle for at least one minute with two and one half per cent caustic maintained at a temperature of at least 120 degrees F., followed by a rinse with a chlorine solution containing at least ten ppm of free chlorine. If caustic is discharged into the bottles through high velocity jets, the preceding procedure shall be considered to constitute both cleaning and bactericidal treatment.

4. A wet method whereby the interior surface fo the bottle is maintained at a termperature of not less than 170 degrees F. for a period of not less that 15 seconds.

5. Where automatic bottle washers in which caustic is discharged into the bottles through high velocity jets, commonly known as "hydro" type, or of the soaker type are used, such will be considered to constitute both cleaning and bactericidal treatment provided that all surfaces of the bottles are exposed for at least five minutes to a solution containing at least two and one-half (2-1/2) percent caustic and maintained at a temperature of at least 120 degrees F., followed by rinse with clean water.

6. Any other method approved by the governmental agency issuing the permit, or having jurisdictional control.

7. When bottles are washed by caustic solution, the temperature of the solution shall be 120 degrees F. minimum and the caustic strength of the solution shall be two and one-half percent or more. Tests of these two qualities will be made at least twice daily and a record shall be kept as information for the ABWA surveyor.

B. Handling: At all times during the washing, handling, filling, and closing of clean bottles and packages, the bottles and packages shall be handled in a manner that will preserve the sterility the inner surfaces and the lips of the openings. Handlers may not touch the inner surfaces and lips, allow the lips to contact clothing or other unsterile articles, sneeze or cough on the inner surfaces and lips, or commit unsanitary acts that may contribute bacteria to the products.

C. Filling: Immediately after sanitizing, all bottles are to be filled and closed. Accumulations are to be no greater than the capacity of the filler. During the filling and closing processes, all bottles are to be protected from, dust, dirt, insects, and other forms of contamination. Hoods over the conveyor from the washer to the filler, and from the filler to the capper, will protect the open clean bottles.

VI. SEALING OF BOTTLES

Immediately after filling, bottles shall be sealed in a manner which will adequately protect the quality of the contents of the bottles and prevent contamination of the end of the bottle necks.

A. Corks are susceptible to bacterial contamination and are not acceptable for use.

B. If screw or snap caps are used, they shall be new caps or shall be subjected to a sanitizing treatment equivalent to that required for bottles.

C. If crown caps are used, only new caps shall be used.

D. New screw, snap and crown caps may be used without prior sanitizing only if received in a condition of known cleanliness and freedom from bacterial contamination and kept until used in a manner which protects them from dust, dirt, insects, and other forms of contamination. Rooms in which caps and crowns are stored will be protected from insects, rodents, and dust. The rooms will be kept clean and sanitary at all times.

VII. LABELING

Each container must display information about it and the product it contains as approved by the governmental agency issuing the permit. This information shall be embossed in the glass or printed on a label or closure.

A. Types of water:

1. Demineralized water may be produced by

one of several methods. The two principal methods are distillation and deionization. The designation on the labels shall be "Purified Water" by "Distillation" or by "Deionization".

2. "Spring Water" designates water that issues from the ground naturally. This water may be collected and controlled by pipes, tunnels, etc.

3. "Well Water" is taken from the ground by drilling. The well may be flowing or one from which water is taken by pumping action.

4. "Drinking Water" may be any water prepared for human consumption. It must meet USPHS drinking water standards. This may be processed or manufactured water.

B. The name and location of bottling plants must be designated.

C. Net contents must be shown on each bottle.

D. Misinformation: This type of statement must not appear on labels:

1. Unsupported claims of medicinal and health giving properties.

2. Reference to bacterial and laboratory examinations made by governmental laboratories.

3. Untrue or misleading statements.

VIII. COOLERS

All coolers must be cleaned and sanitized in accordance with the Good Bottling Practices Guidelines of ABWA as approved by the Board and the membership at Las Vegas, Nevada in October, 1965. A copy of these Guidelines may be obtained from the ABWA office in Los Angeles, California.

IX. SURVEY PROCEDURES

A. Plant operator and supervisors: It will be the continuing responsibility of the plant operator and supervisors to maintain the plant in accordance with the Guidelines of ABWA and the controlling governmental agencies.

B. Governmental agencies: Will be encouraged to make regular inspections of the plants. Basically, the plant operator will be responsible for the establishment of these schedules.

C. Consultant or other authorized agent of ABWA: Surveys of plants for initial approval will be requested by members and a survey date will be set up that is convenient for both the member and the surveying agency. Surveys for reapproval will be made annually without advance notice of the time. Reports of the surveys will be prepared and submitted to the ABWA Headquarters by the Consultant for review and recommendation for either acceptance or rejection of the plant seal of approval to the ABWA Board of Directors.

X. PRODUCT LIABILITY INSURANCE

A member company that is to be approved by the ABWA

will be required to have a product liability insurance policy in th amounts of $100,000 to $300,000 and to maintain this policy throughout the period of approval.

XI. LETTER OF AGREEMENT

After the survey has been completed, ABWA will send to approved companies a letter granting them the right to use the ABWA "Good Bottling Practices Seal of Approval" and outling the restrictions and requirements for its use. When the approved has signed and returned the agreement to ABWA Headquarters, they will then have the right to use the Seal until it is revoked by the American Bottled Water Association.

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